

tained the true nature of the discharge due to quinine sulphate. A. G. Grier detected the magnetic deviation of the  $\beta$  rays of thorium.

Others have come to Montreal from afar, attracted by the magnetic influence of Rutherford, such as Dr. Godlewski, of Lemberg, in Poland, who investigated in Montreal the products of actinium and some notable properties of actinium and uranium. From Frankfurt came Dr. Hahn, discoverer of radiothorium in the laboratory of Sir William Ramsay. Dr. Hahn, whilst working at McGill, also discovered radio-actinium and a new product of thorium. Dr. Levin, from Göttingen, and Dr. Bronson, from Yale, have also done research work whilst at McGill, and the latter has increased our accurate knowledge of various radio-active constants by his modification of the electrometer giving direct and immediate readings. All these workers testify warmly to the inspiration kindled by Rutherford.

His own success as an investigator may be traced to a few well-marked characteristics. The first is the pertinacious and reiterated assault on the particular problem in hand. He does not grope in the dark for chance results, but bombards the particular point which he wishes to attack. He has also an instinctive insight which often makes his initial point of view more trustworthy than the deliberate conclusions of some befogged experimenter. He is not only an industrious, he is also a very rapid worker, but his experimental conditions are varied sufficiently to eliminate error, and his observations are repeated until he has perfect confidence in his results. Most noteworthy of all is the extreme simplicity and directness of his experimental methods. Some observers appear to grow happier as their apparatus becomes more complex. Rutherford selects some ingenious, straightforward attack, but the simplicity is supplemented by the genius which has enabled him to make such great contributions to our knowledge of the mutability of matter and of the atom in evolution.

In conclusion, the writer, who is an Englishman resident in Canada, ventures to emphasise the importance of research laboratories, so well equipped and so distributed that able men in Great Britain may not find themselves hampered through want of means and opportunity to pursue their work. The gift of the Cavendish Laboratory to the University of Cambridge by the late Duke of Devonshire has produced results which are recognised as holding the first place in recent advances in physical science. The Macdonald Physics Building has brilliantly started on its career. But there are other universities less fortunate, and there are other wealthy men.

A. S. EVE.

### THE YORK MEETING OF THE BRITISH ASSOCIATION.

#### PROVISIONAL PROGRAMMES OF THE SECTIONS.

THE local arrangements for this meeting, which will be held at York from August 1 to 8, are progressing extremely satisfactorily, and a large assembly is expected, as nearly 1200 persons from a distance have already signified their intention to be present. The evening meetings will be held in the large hall of the Exhibition Building; 2200 numbered seats are already arranged, while there is space behind, making up a total accommodation of at least 5000 if necessary. All these will have a full view of the speaker, and the lantern screen, though, of course, those behind will be a considerable distance away. It will be well, therefore, for visitors to bring their opera glasses with them.

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The neighbourhood of York affords many objects of interest, archæological, botanical, and geological, and many of these are more readily accessible by road than railway. Cyclists are therefore recommended to bring their machines with them, as the roads are mostly good and level. Hotel and lodging list can, as usual, be obtained of the local secretaries, Davy Hall Chambers, York. The following provisional programmes have been arranged by the committees of the various sections:—

#### SECTION A (MATHEMATICAL AND PHYSICAL SCIENCE).—

This section will, as usual in recent years, meet in three departments. In the chief department a series of discussions has been arranged. Prof. Soddy will open one on the evolution of the elements, and a number of leading workers in radio-activity, including Sir Wm. Ramsay, are expected to follow. Mr. J. Swinburne will discuss the nature of the radiation from incandescent mantles; and Dr. H. Rubens, of Charlottenburg, will expound his views, and illustrate them experimentally. Representatives of the Chemical Section will be deputed to attend both these discussions. It is expected that they will prove of great value as well as of great interest. The Hon. R. J. Strutt has consented to give an account of his recent work on the internal structure of the earth as indicated by the phenomena of radio-activity, and Prof. J. Milne will also speak on it. It is probable that the Geological Section will collaborate in this discussion; hence it will be treated from various points of view. There will be a paper by the Earl of Berkeley on osmotic pressure, which will lead probably to renewed debate on the ever-interesting subject of the nature of solutions. Sir Wm. Ramsay and J. F. Spencer have presented a paper on chemical and electrical changes induced by ultra-violet light, which contains important new matter, as well as a summary of what is at present known on this subject.

There will also be papers by H. Stansfield on photographs of thin liquid films (with experiments); Prof. E. H. Barton and J. Penzer on photographic records of a string's vibrations and responsive motions in the air; Mr. C. E. S. Phillips on the production of an electrically conductive glass; and Prof. W. F. Barrett on entoptic vision. In the Department of Astronomy and Cosmical Physics, a joint discussion has been arranged with Section E (Geography) on the necessity for the re-measurement of the British geodetic arc. This will be opened by Major E. H. Hills, R.E. In the Department of Mathematics, Prof. A. R. Forsyth will read a paper on the different kinds of integrals of partial differential equations. Papers will also be read on a test for the convergence of multiple series, by Mr. T. J. Bromwich; on some notes on finite groups, by Harold Hilton; on Aleph numbers, by Dr. E. W. Hobson; and on the residues of hyper-even numbers, by Lieut.-Colonel A. Cunningham. Prof. Henrici will open a discussion on the notation and use of vectors.

SECTION C (GEOLOGY).—The following are among the principal papers promised for this section: The problems of the Palæozoic glaciations of Australia and South Africa, Prof. J. W. Gregory; On a criterion of the glacial erosion of lake-basins, R. D. Oldham; Notes on recent earthquakes, Prof. J. Milne; On anthropods from the Coal-measures, Dr. Hy. Woodward; On the Jurassic flora of Yorkshire, A. C. Seward; Discussion on the origin of the trias, opened by Prof. Bonney and Mr. J. Lomas; On an artesian boring at Lincoln, Prof. Hull; On the post-Cretaceous stratigraphy of Southern Nigeria, J. Parkinson; On a peculiar variety of sodalite showing colour-change, T. H. Holland. Prof. P. F. Kendall will give a lecture on the geology of the country round York. The president's address will deal with the interglacial problem as it applies to the British Isles. A number of other papers have also been promised—relating mainly to the geology of the Yorkshire district. The following are among the number: On the limestone knolls of Craven, and on an intrusive rock near Grindleton in the West Riding, A. Wilmore; Notes on the glaciation of the Usk and Wye Valleys, Rev. W. Lower Carter; On faults as a predisposing cause of the potholes on Ingleborough, H. Brod-

rick; On a section in a post-glacial deposit at Hornsea, T. Sheppard.

SECTION D (ZOOLOGY).—President's address by Mr. J. J. Lister, F.R.S. *Papers*.—Conjugation of *Paramaecium caudatus*, Prof. Gary N. Calkins (Columbia Univ.); Breeding experiments in canaries—an exception to Mendel's law, Prof. Noorduijn; Preliminary note on a new conception of segregation, A. D. Darbyshire; On epigamic and aposomatic scents in rhopalocera, Dr. F. A. Dixey; Outline sketch of what appears to be a periodic law in organic evolution, with a re-estimation of the cell, H. M. Bernard; Maturation of parthenogenetic eggs, L. Doncaster; The milk dentition of the primitive elephants, Dr. C. W. Andrews; Habits of galatheidæ in relation to their structure, Dr. Herbert J. Fleure and Miss E. F. Galloway; Some points of interest with reference to the mandible in mammals, and Some remarks on the manus of the dolphin, Prof. R. J. Anderson; Title not communicated, but dealing with the zoology of the Scottish Antarctic Expedition, W. F. Lanchester. *Discussions*.—Halolimnic faunas and the Tanganyika problems, J. E. S. Moore; it is hoped the following will speak: Prof. Pilsener, Dr. Bordenger, Prof. Gregory, Mr. Cunningham, Mr. Hudleston, Dr. Calman, Mr. R. T. Gunther. Melanism in Lepidoptera, G. T. Porritt; the following will speak: Mr. J. Arkle, Dr. Dixey, Mr. W. Hewitt, and others. Prof. Gary N. Calkins will introduce a discussion on Protozoan life-histories. Spicule formation, Prof. E. A. Minchin; it is hoped the following will speak: Prof. Yves Delage, Prof. Sollas, Prof. Dendy, Mr. W. Woodland. Suggestions for the more systematic study of oceanic plankton, Dr. G. Herbert Fowler; probable speakers: Prof. Gibson (Louvain), Dr. Norris Wolffenden, Mr. Stanley Gardiner. On the relations of scientific marine investigations to practical fishery problems, Dr. E. J. Allen; it is hoped that in addition to men of science a number of persons practically interested in the fishing industry at Hull and Grimsby will take part in the discussion. On Monday morning (August 6) there will be a joint meeting with Section K (Botany) for the discussion of several cytological papers, among which will be Mr. Doncaster's (*vide supra*). There will also be two afternoon lectures illustrated with lantern slides (semi-popular), namely: The habits of tube-building worms, Arnold T. Watson; Birds and mammals of Yorkshire, Oxley Grabham (local secretary).

SECTION E (GEOGRAPHY).—*Discussions*.—Proposed measurement of geodetic arcs in Great Britain, opened by Major E. H. Hills, C.M.G., R.E.; Changes on the coast of England, especially at the mouth of the Humber, opened by Mr. Clement Reid. *Papers*.—The scientific results of the Scottish Loch survey, James Murray; The Chagos Islands, Indian Ocean, J. Stanley Gardiner; A journey across the Sahara, M. E. P. Gautier (not quite certain); The structure of Southern Nigeria, John Parkinson; The study of Social Geography, Prof. G. W. Hoke, of Ohio State Normal College; A journey in the Central Himalaya, T. G. Longstaff; The future of wheat-growing in Canada, Prof. L. W. Lyde; Geographical photography, John Thomson. *Afternoon Lectures*.—Past and present in Asia Minor, Prof. W. M. Ramsay; The visit of the Association to S. Africa, H. Yule Oldham; A tour in South-East Persia, Major P. M. Sykes.

SECTION G (ENGINEERING).—Address by Prof. J. A. Ewing, president of the Section; Modern armour and its attack, Major W. E. Edwards; The deformation and fracture of iron and steel, W. Rosenhain; Segregation in steel ingots, and its effect in modifying the mechanical properties of steel, J. E. Stead; Structural changes in nickel wire at high temperatures, H. C. H. Carpenter; Standardisation in British engineering practice, Sir John Wolfe Barry, K.C.B.; Recent advances in our knowledge of radiation phenomena, and their bearing on the optical measurement of temperature, J. B. Henderson; The removal of dust and smoke from chimney gases, S. H. Davies and F. G. Fryer; Glow lamps up-to-date, and the grading of voltages, Sir W. H. Preece, K.C.B.; The advent of single phase electric traction on railways, C. F. Jenkin; Some recent developments of the steam turbine, G. Gerald Stoney; Some recent experimental results with internal combustion engines, Prof. W. E. Dalby; A general supply of gas for heat, light, and

power purposes, A. J. Martin; Experiments illustrating the balancing of engines, Prof. W. E. Dalby; An indicator for high speed engines, Prof. B. Hopkinson; A new form of transmission dynamometer, Prof. B. Hopkinson and L. G. P. Thring; The new engineering laboratories, Edinburgh University, and their equipment, Prof. T. Hudson Beare; Waterproof roads as a solution of the dust problem, Douglas Mackenzie; The central technical college lecture table testing machine, Prof. Ashcroft; The teaching of mechanics by experiment (with illustrations), C. E. Ashford.

SECTION H (ANTHROPOLOGY).—In this section the proceedings promise to prove as interesting as usual, and quite a large number of the communications are likely to give rise to considerable discussion. One of the most important items in the programme will be a discussion on the head-form of the prehistoric and early historic races in Britain which has been arranged to take place in connection with an exhibit of British crania, now in the possession of the Yorkshire Philosophical Society, and crania from Laver Hill. The discussion will be opened by Mr. J. Gray with a paper surveying the evidence, anthropological and collateral, bearing on the affinities and probable origin of the prehistoric and early historic races which have settled in Britain. Dr. F. C. Shrubbsall has also promised to contribute, and Dr. W. Wright and others will take part in the discussion. In this connection considerable interest attaches to a paper on the relations between archaeological and anthropographical data in the ethnology of Scotland by Dr. T. H. Bryce, and a paper by Mr. J. R. Mortimer on the relation between stature and head-form in the skeletal remains found in the round barrows of Yorkshire, based on data obtained from his own collections at Driffield. Mr. H. Brodrick will describe a skeleton recently discovered in Scoska Cave, Littondale. Two communications by Dr. W. L. H. Duckworth will deal respectively with a rare anomaly in human crania from Kawiawata Island, New Guinea, and observations on a eunuchoid subject in the Cambridge Anatomy School. Dr. C. S. Myers contributes, as an addendum to the report of the committee on anthropometric investigations among the native troops of the Egyptian Army, and notes on the distribution of cephalic and nasal indices in different provinces of Egypt.

In general ethnography communications are hardly as numerous as usual. Dr. Haddon will contribute a paper on the ethnology of South Africa, based principally on material collected during the visit of the association to South Africa last year, and Mr. S. Dornan, a South African member, sends a communication dealing with the Bushmen of Basutoland. Messrs. T. A. Joyce and E. Torday jointly will contribute a paper on the Ba-Yakka, a tribe in the Congo Free State. Among papers dealing with points of a more detailed character, Dr. Rivers offers, as a possible explanation, alternative, at least in India, of the importance of the maternal uncle among primitive races, a survival in the marriage customs of southern India, and an account of the astronomy of the Torres Straits islanders. Mr. H. A. Rose will contribute a paper on the custom of female infanticide in India, and Prof. Ridgeway will deal with the origin of the fiddle and guitar. Dr. T. H. Bryce and Mr. Newberry, of the Glasgow School of Art, will exhibit a number of examples of the "door-step" art—designs used by peasants to decorate their door-steps and dairy and kitchen floors in Scotland, which present many interesting features.

In archæology, Prof. W. M. Flinders Petrie will give an account of a Hyksos fortress and other discoveries in Egypt in 1906; Dr. R. C. Bosanquet will describe his excavations in Sparta, and a communication from Mr. J. L. Myres will deal with early traces of human types in the Ægean. Mr. D. G. Hogarth hopes to communicate an account of the treasures of the primitive Artemisia of Ephesus, should the interval before the meeting be sufficient to allow an examination of the objects from the site, which have only just arrived in England. Major P. M. Sykes will exhibit a collection of bronze weapons and implements from Persia, which are discussed in a communication by the Rev. Canon Greenwell. Dr. T. Ashby will read papers on the recent excavations in the Forum, and the excavations at Caerwent in 1904-6. Prof. R. S. Conway



will contribute a paper on the Keltic weights found at Melandra, which throw considerable light on the subdivisions of the pre-Roman pound in Britain. Excavations on the interesting palæolithic site at Ipswich, of which accounts have on two occasions been presented to the section, have now brought to light a number of small implements which would appear to have been used as scrapers, and further evidence as to the relations of the implementiferous strata, which will be described by Miss Layard. Miss Layard also contributes an account of the excavation of an Anglo-Saxon cemetery at Ipswich, which has produced, among other objects, fibulæ of interesting types, rare in Great Britain. Mr. Rudler's paper on the "Red Hills" of the east coast salt-marshes will describe the low mounds of burnt earth of frequent occurrence on the estuarial marshes of Essex, which it is now proposed to examine systematically.

**SECTION I (PHYSIOLOGY).—August 2:** Address by the president, Prof. Gotch; Report of committee on The metabolic balance sheet of the tissues; Papers on physiology. **August 3:** The nitrification of sewage, Dr. George Reid; Papers on hygiene; Report of the committee for the investigation of the effect of climate upon health. **August 5:** Discussion on the physiological value of rest, opened by Dr. T. D. Acland. Dr. Rivers, Dr. Myers, Prof. McDougall are expected to take part. Papers on the special senses, psychology and electrophysiology. Dr. Bevan Lewis and Dr. Smith will give a demonstration on improved methods of studying the central nervous system, and a paper on the pericellular plexus and neuro fibrils of the cerebral cortex. **August 6:** Joint discussion with Section B (Chemistry) on the factors which determine minimum diet values, opened by Dr. F. Gowland Hopkins. This, of course, has special interest, as much sociological work has been done in York by Mr. B. Seebohm Rowntree on the limits of diet. Prof. Armstrong and other members of the chemical section will take part. Papers on pathology. **August 7:** General papers.

**SECTION K (BOTANY).—**At least three of the sessions of this section will be devoted to special topics of current interest, the proceedings in each opening with a general paper or address dealing with the topic as a whole, followed by more special papers and a general discussion. The three topics chosen for the present meeting are as follows:—(1) Some aspects of the present position of Palæozoic botany will be dealt with by Dr. D. H. Scott, F.R.S., and the conditions of growth of Carboniferous plants by Prof. F. E. Weiss, Miss M. C. Stopes, and others. (2) The nature of fertilisation and kindred problems, at a joint session with Section D (Zoology). Mr. V. H. Blackman will open the proceedings with a general address setting forth the present position of the subject. Prof. Farmer, F.R.S., is expected to contribute a paper on the cytological features of apospory, and Mr. Doncaster one on some cytological features of animal parthenogenesis. Several eminent foreign botanists, distinguished for their work on kindred topics, have promised to be present, among them being Prof. Tschermak, of Vienna, Prof. Johansen and Dr. Ostenfeld, of Copenhagen, Dr. Rosenberg, of Stockholm, and Dr. Lotsy, of Leyden. (3) The phylogenetic value of the vascular system of seedlings. Mr. A. G. Tansley and Miss E. N. Thomas will open the proceedings, while Prof. Jeffrey, of Harvard, Messrs. A. W. Hill, T. G. Hill, and Miss Ethel Sargent are expected to contribute by papers or otherwise to the discussion.

Dr. T. W. Woodhead, who has been spending the last year at Zurich with Prof. Schröter, will communicate a paper on ecological work in Switzerland, Mr. C. E. Moss will give an account of survey work and mapping in Somersetshire, while Dr. Fritsch and Mr. Walker will contribute papers on algal ecology. Prof. Wyndham Dunstan, F.R.S., is expected to give a general account of his work on hydrocyanic acid in metabolism, but it is not yet certain whether this will be presented to the botanical or to the chemical section. Among other papers may be mentioned Prof. H. H. W. Pearson's on the habitats and habits of S. African cycads, communicated by Mr. A. C. Seward, F.R.S., and Mr. Hugh Richardson's on the vegetation of Teneriffe. It is hoped that Dr. Blakeslee may be able to be present and give an account of his work on sexual

differentiation in the Mucorineæ, and also of his important recent discoveries of sexual differentiation in the spores of Marchantia.

**SECTION L (EDUCATIONAL SCIENCE).—August 2:** Presidential address, Prof. Michael E. Sadler; Report on health in schools, Prof. Sherrington; Medical inspection of schools and colleges, Sir Lauder Brunton, Sir Henry Craik; Physical training, Dr. Ethel Williams, Major Norman; The education of workpeople, Hugh O. Meredith. **August 3:** Curriculum of primary schools and the training of teachers in such schools; Report of committee on the courses of practical, experimental, and observational studies most suitable to elementary schools: general principles, Sir Philip Magnus, M.P., subcommittee report on arithmetic and mensuration, Prof. R. A. Gregory, subcommittee report on nature-study, Hugh Richardson. Contributions to the discussion will be made by Principal Burrell, T. S. Dymond, Prof. Green, J. C. Hudson. Training for the home duties of women. Report of subcommittee on Domestic studies, Geo. Fletcher. The following will contribute to the discussion:—Miss Mary E. Marsden, Prof. A. Smithells, Miss Maud Taylor, Prof. H. E. Armstrong, Mrs. Margaret Pillow, B. S. Rowntree, Mrs. Marvin, Miss Romley Wright. **August 6:** The balance of subjects in the curriculum of the secondary school and the training of teachers for such schools, T. E. Page, Hon. and Rev. E. Lyttelton, Rev. E. C. Owen, Arthur Rowntree (Leisure pursuits), Gidley Robinson (Preparatory schools), C. M. Stuart, J. H. Leonard, Miss E. E. C. Tomes (Training), Prof. Rayment (Training); The uncertainty of educational values in the absence of scientific experiment, Dr. E. P. Culverwell; The demonstration school as a field for scientific research in school teaching, Prof. J. J. Findlay. **August 7:** Inspection and examination of schools, C. M. Stuart, J. L. Holland, Geo. Fletcher, and others; The teaching of modern languages, Prof. Wyld, Prof. Robertson; Experiments and results in elementary modern language teaching conducted since 1892, Prof. J. J. Findlay; (joint meeting with Sections A and G) The teaching of mechanics by experiment, C. E. Ashford.

## NOTES.

THE death of Prof. Drude by his own hand at the early age of forty-three is a serious loss to physical science. Born at Brunswick in 1863, he made his mark first as a pupil of Voigt at Göttingen, and his series of papers in which he applied the electromagnetic theory of Maxwell, as developed by Herz, to the problems of light, stamped him as a physicist of the first rank. These appeared in *Wiedemann's Annalen* in the years 1896-9, and as more fully developed in the author's "Physics of the Ether" and his text-book of optics, have received recognition in these columns. Among them may be specially noted his theory of the magneto-optic phenomena of iron, nickel, and cobalt, 1897; the theory of anomalous dispersion, 1898; and of electric dispersion, 1899. Drude was also an experimenter, and was able to devise and carry out critical experiments to test, where necessary, fundamental points of his theory. In 1900 he succeeded Wiedemann as editor of the *Annalen der Physik*, and under his capable guidance that well-known journal has fully maintained its reputation, while only last year he was called to Berlin as professor of physics in succession to Warburg, now president of the Reichsanstalt. The physics school of the University of Berlin has suffered severely in recent years, and the loss of the brilliant physicist who had so recently joined them will be deeply felt by his friends and colleagues.

THE report on the civil hospitals and dispensaries in the United Provinces states, says the *Pioneer Mail*, that five cases of snake-bite have been successfully treated at Gorakhpur with Dr. Calmette's anti-venene and permanganate of potash. They seemed bad cases, and almost